

Funktion-One Resolution Series

Michael Fronzek attends a demo of the new Funktion-One system and learns more from designer, and industry legend, Tony Andrews.

It's a beautiful sunny winter morning as my Ferry pauses to negotiate the last 100 metres of its journey south. In the distance, on the forecourt of the Sydney Opera House beside the sun-drenched sandstone cliff, a crane is beginning to lift a cluster of purple boxes high into the air. As I make my way towards the forecourt, the first strains of music begin to stir in the distance. Fragments of tunes bounce off the Opera House sails and drift on the gusts of wind like puffs of sound.

I have come, like many others this morning, out of curiosity and respect, to hear the latest offspring of a man whose ideas and influence in live sound reach back

decades. Tony Andrews is making some minor adjustments on a small mixing console at the base of the forecourt steps but already I can see his wide grin from across the road. The music swells and it sounds great and his eyes light up as the groove settles in.

The Sydney Opera House is intending to stage more regular outdoor concerts in the future and today is an opportunity for them to evaluate a Resolution sound system by Funktion-One. Production company, NorWest Productions, who only took delivery of this particular system two days ago, have also used the opportunity to familiarise themselves with their latest acquisition and hone their rigging skills. I'm told the whole cluster of eight Resolution 5s, four downfills and two F218s, was rigged and raised in just over 10 minutes – about the same time it took to de-rig. No adjustments were made to crossovers or levels and no EQ was being used. What we were hearing was the system, straight out of the box. And 100 metres away on the Opera House steps, it sounded gorgeous, the closest thing to hi-fi I've ever heard in the open air.

Now, the Opera House forecourt is a pretty special place. Not only is it a spectacular location but it's also a perfect venue for live music. The grand staircase provides plenty of tiered seating but also reflects all sound skywards, minimising any hard reflections back towards the stage. The Opera House sails diffuse and reflect soundwaves away from the stage and audience and only the glass facade of the restaurant degrades an otherwise idyllic space. I travelled the length and breadth of the forecourt, listening to the intelligibility and tonal balance

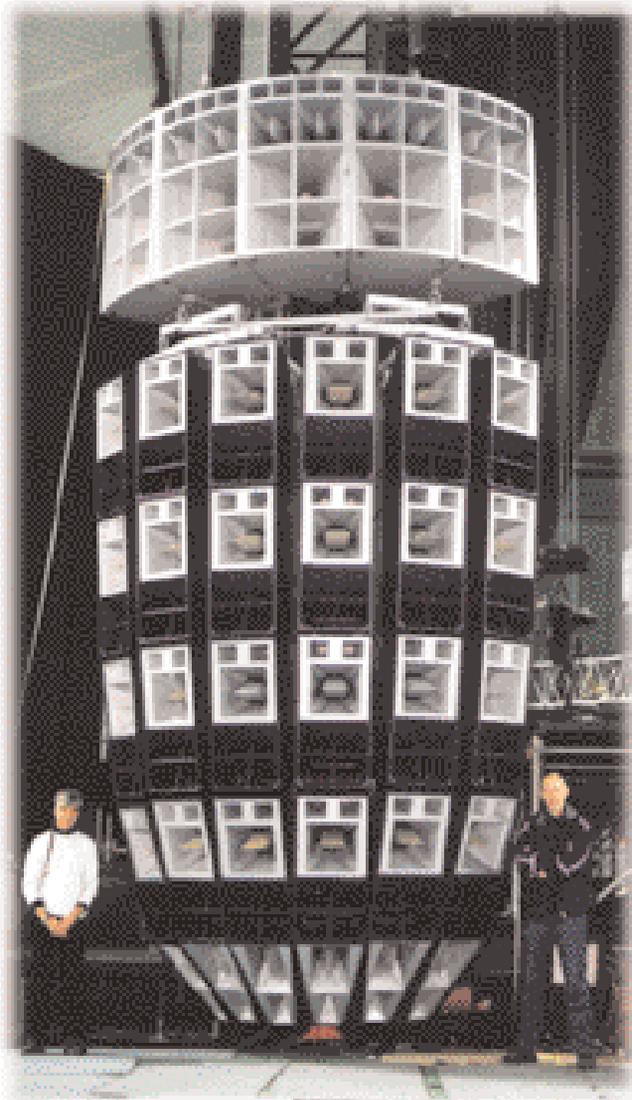
Chris Kennedy – Norwest Productions

Norwest Productions in Sydney has taken on a significant Resolution system. In fact, the total inventory now includes 30 x Resolution 5, 10 x Resolution 4D, 8 x Resolution 4, 4 x Resolution 118 flown subs, 6 x Resolution 2 (as front-fill) and 24 x Resolution 218 subs

Head of Norwest, Chris Kennedy, couldn't be happier with his new acquisition:

"This system has really blown us away with its performance. On the first gig we sent the system to, FOH Engineer Tony Moffatt, gave me a bell. 'You've done me out of a job here, Chris.' I asked him why. 'Well, I went to tune the system, pulled out a few frequencies on the graphic, and then put them straight back in! What sort of work are the XTA system controllers doing to achieve that?' I told him the truth. Which was: the XTAs (apart from setting the crossover frequencies) were doing precisely nothing. The system was running totally flat.

"Since then we've taken the Resolution rig out on a huge variety of shows in all sorts of venues and it's responded amazingly. I'm looking forward to putting the full system together for the Jamiroquai tour when it hits Australia, that'll be something special."



Resolution 5/9 rig used earlier this year for Jamiroquai in the Tokyo Dome.

of this single cluster. At one point, someone nudged the level up well over 105dB SPL and all activity stopped. People froze in their tracks; there was no way you couldn't take notice. Clean and strong, not a hint of distortion. The sort of vocal quality I'm used to hearing in a studio, absent of the bark of compression drivers pounding at your ears. I later learnt that Jay Kay from Jamiroquai has a pair of Resolution-4s in his home studio and that their last album was mixed on them.

Tony Andrews & The Art of Listening

Tony's salt and pepper ponytail bopped to the beat. He was happy; it sounded good. You quickly realise that for Tony, that's all that really matters – how does it sound? Later, over coffee, Tony hisses his exasperation that the industry has “forgotten how to listen” and instead of pushing the envelope, when it comes to developing loudspeaker technology, is either regurgitating old methods or making bad copies of whatever is currently “in fashion”. This is probably illustrated best by Tony's complete astonishment with manufacturers, that after nearly a century of use, are still crossing over two-inch horn-loaded compression drivers as low as 800Hz without any apparent regard or care for how bad they sound. For most designers, a lateral and holistic approach to development is seriously lacking.

Tony started experimenting with audio in the late '60s, building and rebuilding countless speaker/box combinations, moving them around a room and getting a feeling for what sounded best. He noticed the boundary effects and bottom end lift that resulted from mounting his speakers in the corners of rooms and he explored the folded-horn principles that were being used by Klipsch. His addiction to bass led him to be regarded early on as

the ‘Bass Bin’ guru of the '70s when he designed the dual 18-inch bass bin; his “longest standing creation”.

After achieving such success with his bass bins, he focussed his attention on the “lack of vocal clarity” and “harshness” that plagued most systems, still dependent on horn-loaded compression drivers. Tony has always loved the sound of paper cones but couldn't achieve the SPL that he needed to compete with horns. To reach that order of magnitude of increased efficiency, he and former partner Tim Isaac began experimenting with truncated horns and waveguides. Then, by placing a rolling pin down the middle of the driver they noticed an immediate increase in coherency. This was the seed that had grown into the Turbosound philosophy and has now evolved further into Funktion-One.

His approach and the approach of his partner John Newsham and their team – many of who have followed them from Turbosound – is an empirical one. Ideas are constantly being tried and tested. Technologies are evolved and selected and feedback from end users is channelled back into development until a product reaches a high level of refinement.

Funktion-One has not jumped on the Line Array bandwagon like so many others. Instead they have built steadily on three decades of development in spherical arrays that has furnished them with a list of patents and a legendary reputation. This has evolved into the ‘axehead’ of today's Resolution series – designed to compliment the truncated horn that forms the high/mid waveguide. This combination plus an eight-inch paper cone loudspeaker in the 437Hz to 5.77kHz band is the key to the exceptional sound quality of this high performance, hi-Q component. Dedicating a low distortion driver to this whole frequency band through the mid range is virtually

The Resolution Range by Funktion-One

Funktion-One has set out with ‘size, scalability, efficiency and quality’ as the key points in developing its Resolution line of products. It has focused on optimising the dispersion for each band by customising its respective waveguide so that each three-way module projects efficiently across the spectrum into a tight sector of the spherical wave-space (sectorially additive). Linking multiple modules into an array allows the cluster to service a controlled listening area. Each sector has minimal coupling with the next and hence little in the way of a generated interference pattern. This ‘Lego block’ approach allows Funktion-One to use a small product line to cover an enormous range of applications by scaling each system accordingly. End users claim they use 25% less enclosures than older systems to achieve the same coverage and SPL.

The clever rigging systems and weatherproofing flaps built into these small lightweight modules allow fast and accurate cluster assembly and disassembly with minimal external parts. Each enclosure can be angled vertically to pre-defined stops that provide flexibility and repeatability in a wide array of applications. A detachable wheel-board provides

protection, easy stacking and mobility for each module. The engineering and aesthetics of the Resolution system is simple, elegant and precise and the ease with which road crew can handle and manipulate these modules is a joy to behold.

The core of the range is based around the Resolution 4 and 5 three-way active enclosures and the Resolution 18 flying bass bin. Each enclosure has the same dimensions allowing easy and systematic mounting to a common frame. With each cabinet having a height of 975mm, width of 484mm and depth of 510mm, the resolution enclosures are a comfortable size to handle. Combine this with a maximum weight of 49kg and you have a very manageable package that can easily be handled by an individual.

The Resolution 5 is a long throw, narrow dispersion enclosure that covers three bands from 114Hz to 18kHz ± 3 dB (114Hz to 445Hz, 437Hz to 5.77kHz and 5.55kHz to 18kHz). The hi-frequency band is handled by two one-inch horn-loaded compression drivers which have a combined sensitivity of 113dB SPL @ 1m (1W) and a combined power handling of 100W

(RMS) with a nominal impedance of 16 Ω . The upper mids are handled by an eight-inch cone that has been mounted into the distinctive silver Funktion One waveguide and faceted ‘axehead’. It has a horizontal dispersion angle of 25° and a vertical dispersion of 20°. Sensitivity of 110dB SPL @ 1m (1W) and has a power handling of 200W (RMS) with a nominal impedance of 16 Ω . The atypical use of a horn-loaded paper cone driver instead of a compression driver over this enormous passband is key to the clarity and lack of distortion and colouration in this range of loudspeakers. The increase in passband efficiency produced by the waveguide/axehead combination remains a radical departure from most other loudspeaker manufacturers.

A horn-loaded 12-inch cone services the lower mid band and is critical in allowing the Resolution series to achieve the warmth and punch it has quickly become renowned for. It has a sensitivity of 105dB SPL @ 1m (1W) and has a power handling of 300W (RMS) with a nominal impedance of 8 Ω .



An animated Tony Andrews comes to grips with his system during the Sydney Opera House demonstration.

unheard of in live sound, but the results speak for themselves. Unlike many other manufacturers, Funktion-One only introduces a compression driver above 5.77kHz where distortion components can only fall in the last octave of audible sound reproduction. The lower mid range is handled by a horn loaded 12-inch cone from 114Hz to 445Hz with the low frequencies being managed by dedicated bass bins. Tony claims it's these critical two octaves in the low mids that give the warmth and punch to the Funktion-One sound.

So what is the difference between Line Source Arrays and Point Source Arrays? Line sources radiate a wavefront that is cylindrical in nature, point sources

radiate a spherical wavefront. At lower frequencies and large enough radii, both systems converge towards a spherical wavefront, but over short distances and higher frequencies the line array's wavefront area is increasing proportional to throw radius, whereas the spherical wavefront area is increasing at the radius squared. This means at high frequencies and short throws, a line array has less attenuation over distance than a point source. The line array relies on an acoustic phenomenon caused by the coupling of multiple drivers to achieve this effect.

Where Tony is critical of line arrays is in the "confusing multiple arrivals" of different speakers in the array at the listening position and the smearing of transients and "loss of coherence". Tony speaks highly of Dr. Christian Heil [designer of the L-Acoustics V-DOSC system] and his perseverance in the development of line arrays and their applications, but he feels that line arrays are

limited in that the "room shape needs to be chosen to suit the system" in order to have "some measure of success". And of course the use of 1.4-inch compression drivers crossed over at 1.3kHz only reinforced Tony's argument about the "lack of vocal clarity". Furthermore the larger component dimensions and increased weight of the line array makes handling difficult and has spawned the production of arrays of different sizes because of their "lack of adaptability".

Line Array Popularity

When I ask Tony to explain why the Line Array is so popular amongst hire companies, his reply is matter of fact – "they're fashion victims". But Tony is also quietly confident – "when they're ready for quality, they'll come find us".

Tony's insight into his own personal philosophy and his infectious enthusiasm for music and sound, leaves me buzzing. It's clear to me that it's the Tony Andrews' of the world that keep the pressure on when it comes to striving for excellence. Innovation is still led by small groups of individuals whose passion and single-minded dedication set standards that are at best copied by others.



Michael Fronzek is a director of Sounds Spaces; an acoustic and technical design and installation firm specialising in sound studios. He has a background in Electrical Engineering and music and has worked in recording studios and multi-media for the last 22 years.

Other devices in the Resolution Range

Resolution 4

Type: Wide dispersion enclosure

Resolution Downfill

Type: High frequency and upper midrange trapezoidal enclosure slung from the underside of a cluster.

Resolution 18

Type: Single 18-inch sub in an enclosure identical in size to the Resolution 4s and 5s. Frequency response: 45Hz to 114Hz

Resolution 9

Type: Super long throw three-way enclosure designed for large stadium applications.

Resolution 2

Type: A small full range, fully horn-loaded, three-way, wide dispersion enclosure designed for small to medium installation and touring applications. Highly suitable as a DJ monitor.

F118 and F218

Type: A single and double 18-inch enclosures respectively, designed specifically for floor mounting.

AX88

Type: High frequency and upper mid package for wide dispersion fixed installation applications.

Manufacturer Info

• Funktion-One

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